



Northernmost new records of *Enyaliooides touzeti* Torres-Carvajal, Almendáriz, Valencia, Yáñez-Muñoz & Reyes, 2008 (Sauria: Hoplocercidae) from Ecuador: altitudinal and latitudinal distribution extension, new provincial and biogeographical record

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Abstract: In this note, we present new locality records and extend the known geographical distribution and elevation range of the dwarf iguana *Enyaliooides touzeti* in southern Ecuador. Presence of *E. touzeti* in heavily deforested coastal regions of southwestern Ecuador suggests an urgent need for research to evaluate its conservation status.

Key words: coastal range; Equatorial Pacific; dwarf-iguana; Churute; Andes

Lizards of the genus *Enyaliooides* (Hoplocercidae) are distributed in lowland cloud and rainforests of Panama, Colombia, Ecuador, Peru, Brazil and Bolivia (TORRES-CARVAJAL et al. 2011). In Ecuador, the genus *Enyaliooides* Boulenger, 1885 is represented by 10 species, whereas the genus contains 15 species (TORRES-CARVAJAL et al. 2015). This makes Ecuador the country with the highest diversity for this family. In this country, four species are distributed on the western lowlands and adjacent slopes of the Andes (*Enyaliooides altotambo*, *E. heterolepis*, *E. oshaughnessyi* and *E. touzeti*). *Enyaliooides touzeti* was described in 2008 from lowland Andean cloud forests in southwestern Ecuador (TORRES-CARVAJAL et al. 2008), and it is part of a clade formed by *E. altotambo* and *E. oshaughnessyi* (TORRES-CARVAJAL et al. 2015). Previous knowledge about *E. touzeti* was from five localities in Ecuadorian provinces of Azuay, Cañar and El Oro at elevations between 300 and 600 m, and from two localities in Peru: Parque Nacional Cerros de Amotape, 740 m (VENEGAS et al. 2010).

Two specimens of *Enyaliooides touzeti*, one female (LCCJ 001) and one male (LCCJ 002) were collected by LA, CG, CLG and JLC in the Reserva Ecológica Manglares Churute, Guayas province (Figure 1), during field work conducted on 7–8 July 2015 at “Sendero Aulladores” (-2.418306,

-79.649667, 50 m) and Mono Loco Lodge, “Cerro Cimalón” (-2.442667, -79.562361, 234 m), respectively. The specimens were deposited in the life collection of Zoológico Amaru, Cuenca, Ecuador. On 27 December 2011, Lucas Bustamante and AA collected one male (MZUTI 2646) at “Hacienda Huatacón” (-2.490000, -79.182500, 1045 m), Cañar province, Ecuador. On 21 December 2013, one male was collected by Lucas Bustamante and AA (MZUTI 3374) at “Flor y Selva” (-2.656944, -79.531111, 136 m), Guayas province, Ecuador (Figure 1). These last two specimens were euthanized with 20% benzocaine, fixed in 10% formalin and stored in 70% ethanol; both were deposited in the Museo de Zoología, Universidad Tecnológica Indoamérica, Quito, Ecuador. Specimens were collected under collection permits # MAE-DNB-CM-2015-0017 issued by Ministerio del Ambiente of Ecuador and granted to Universidad Tecnológica Indoamérica.

All specimens, three males (MZUTI 2646, MZUTI 3374 and LCCJ 002) and one female (LCCJ 001), agree with diagnostic characters listed at the time of description of *Enyaliooides touzeti* (TORRES-CARVAJAL et al. 2008), as follows: ventral scales keeled; dorsal head scales keeled; paravertebral scales small and imbricate; vertebral crest continuous along neck and body; vertebral scales in neck region in adult males more than twice as high as vertebral scales in pelvic region; prominent gular fold in males covered by a dark patch (Figure 1); one femoral pore for each leg; caudal scales keeled and imbricate but not projected and dorsum and limbs homogeneous in size without projecting scales (TORRES-CARVAJAL et al. 2008, 2011). These characters separate *E. touzeti* from other species of dwarf-iguanas in western Ecuador (e.g., *E. heterolepis* and *E. oshaughnessyi*).

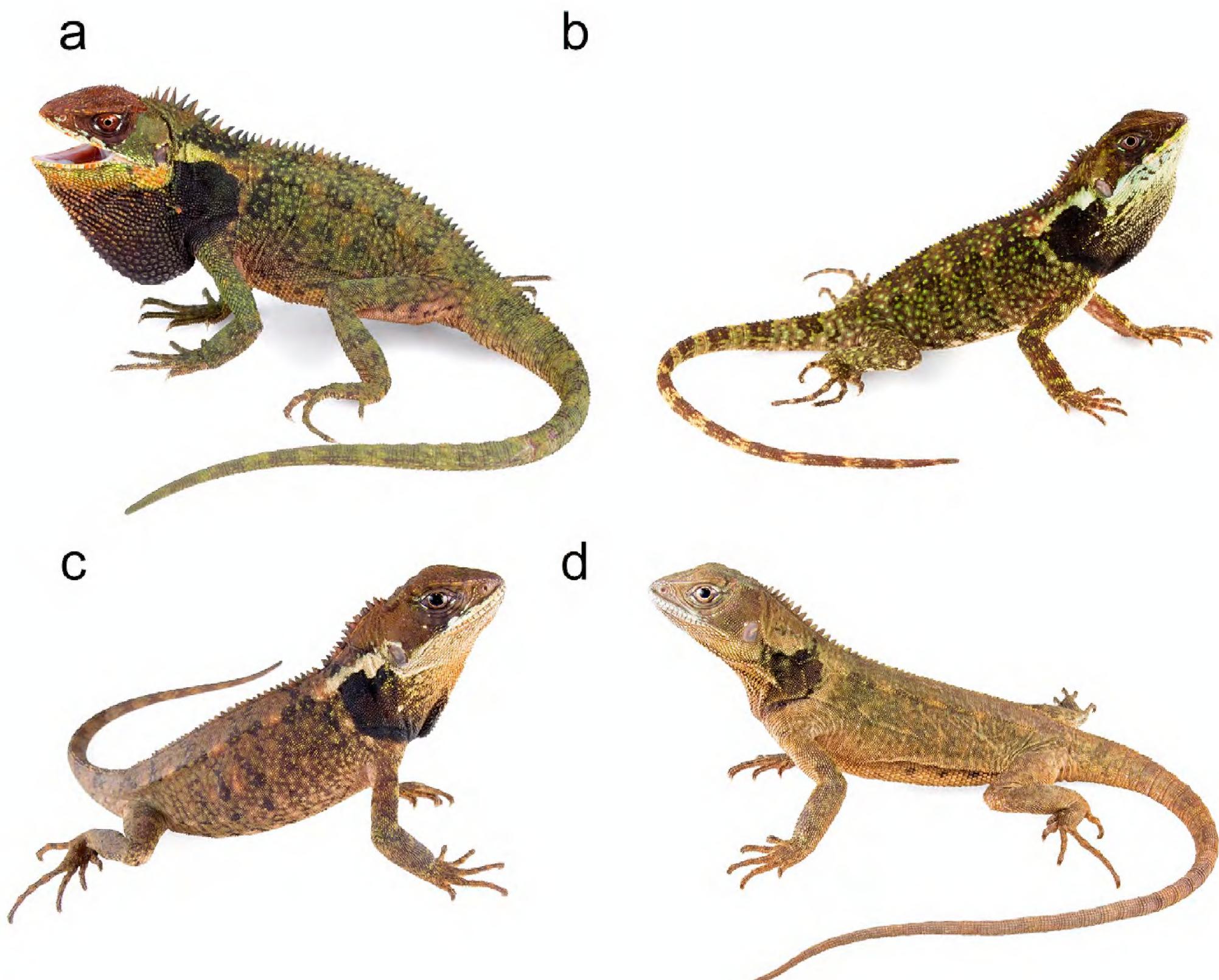


Figure 1. Specimens of *Enyaliooides touzeti* reported in the present work. **a.** Male MZUTI 2646, **b)** male MZUTI 3374. **c.** Male LCCJ 002. **d.** Female LCCJ 001.

Both specimens LCCJ 001 and LCCJ 002 were found on branches between 120 and 150 cm above the ground. MZUTI 2646 now represents the easternmost record, located ca. 21 km NE of the previous easternmost record (Manta Real, paratype: DHMECN 1396, see TORRES-CARVAJAL et al. 2008). MZUA 157 extends the species' altitudinal range 346 m above the previous highest locality (Parque Nacional Cerros de Amotape, 740 m) (VENEGAS et al. 2010). LCCJ 001 increases the species' northern range of occurrence ca. 17 km airline distance from its previous northernmost record and is 232 m below the previous lowest locality (Bella María, 282 m) (TORRES-CARVAJAL et al. 2011) (Figure 2; Appendix, Table A1). This record becomes the first of *Enyaliooides touzeti* in a protected natural area of Heritage of Natural Areas of the State (PANE, for its acronym in Spanish) and deserves special attention because the habitat within its known range of distribution in western Ecuador is heavily fragmented (e.g., Manta Real) (DODSON & GENTRY 1991; LESSMANN et al. 2014). Moreover, *E. touzeti* has not yet been evaluated against the criteria of the International Union for Conservation of

Nature (IUCN) Red List. Likewise, this record is the first in a semideciduous and evergreen lowland montane forest belonging to the Coastal Mountain Range biogeographical sector (SIERRA 1999), *E. touzeti* was previously known only from seasonal evergreen forests along foothills of the Andes. These new records of *E. touzeti* are included in areas with vegetation generally associated to both the Andes and the Choco lowlands, which would help understand the current patterns of distribution.

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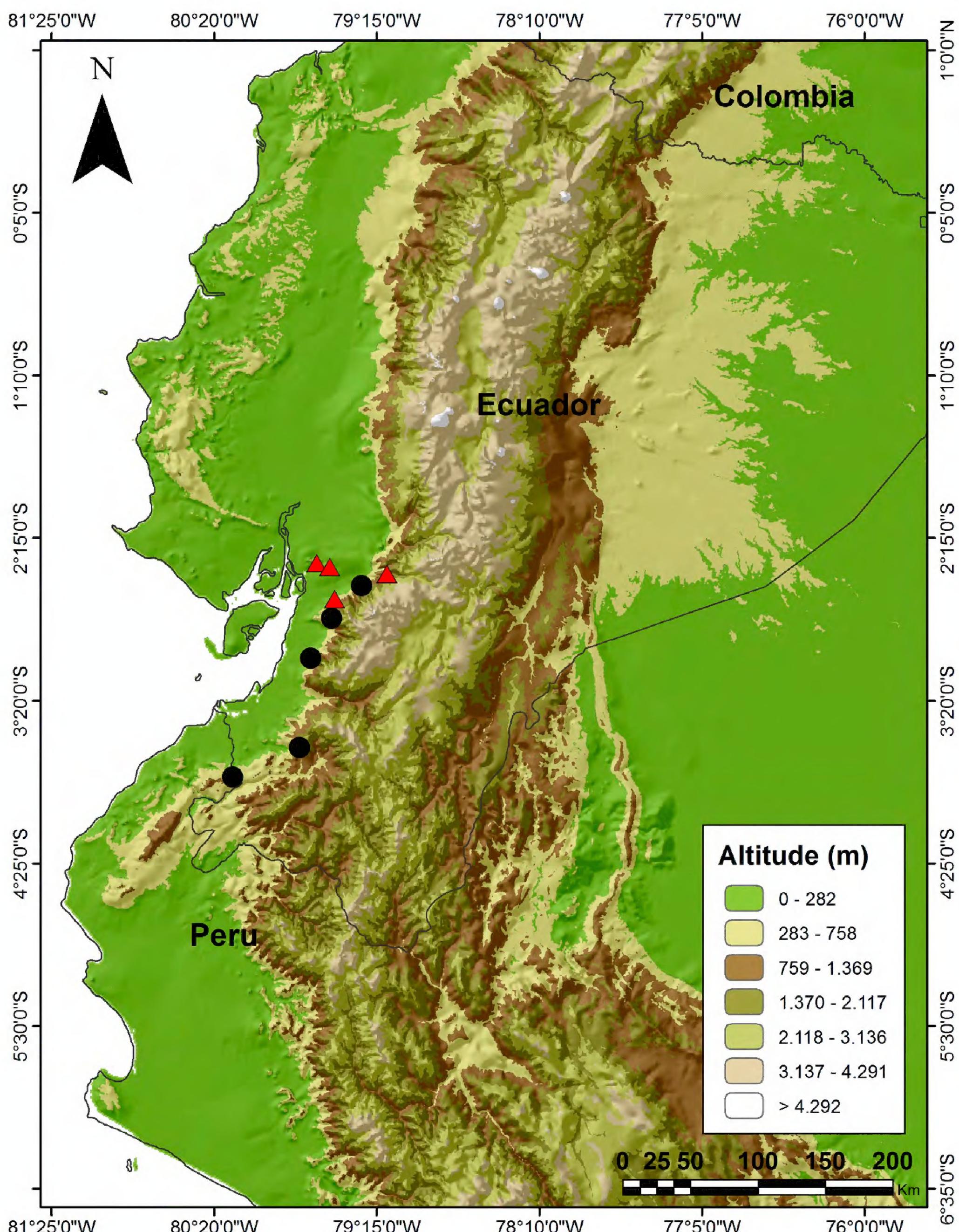


Figure 2. Map showing the distribution of *Enyaliooides touzeti* in Ecuador. Black circles represent literature data. Red triangles correspond to the new localities reported in the present work.

LITERATURE CITED

DODSON, C.H. & A.H. GENTRY. 1991. Biological extinction in western Ecuador. Annals of the Missouri Botanical Garden 78: 273–295.

LESSMANN, J., J. MUÑOZ & E. BONACCORSO. 2014. Maximizing species conservation in continental Ecuador: a case of systematic conservation planning for biodiverse regions. Ecology and Evolution 4(12): 2410–2422. doi: [10.1002/ece3.1102](https://doi.org/10.1002/ece3.1102)

SIERRA, R. 1999. Propuesta preliminar de un sistema de clasificación de vegetación para el Ecuador continental. Quito: Proyecto INEFAN/GEF-BIRF y EcoCiencia. 174 pp. http://www.ecociencia.org/archivos/RSierra_PropVegEcuador_1999-120103.pdf

TORRES-CARVAJAL, O., A. ALMENDÁRIZ, J. VALENCIA, M. YAÑEZ-MUÑOZ & J.P. REYES. 2008. A new species of *Enyaliooides* (Iguanidae: Hoplocercinae) from southwestern Ecuador. Papéis Avulsos de Zoologia 48(20): 227–235. doi: [10.1590/S0031-10492008002000001](https://doi.org/10.1590/S0031-10492008002000001)

TORRES-CARVAJAL, O., P.J. VENEGAS & K. DE QUEIROZ. 2015. Three new species of woodlizards (Hoplocercinae, *Enyaliooides*) from northwestern South America. ZooKeys 494: 107–132. doi: [10.3897/zookeys.494.8903](https://doi.org/10.3897/zookeys.494.8903)

TORRES-CARVAJAL, O., R. ETHERIDGE & K. DE QUEIROZ. 2011. A systematic revision of Neotropical lizards in the clade Hoplocercinae (Squamata: Iguania). Zootaxa 2752: 1–44. <http://www.mapress.com/j/zt/article/view/10399>

VENEGAS, P.J., M. CUYOS & K.Y. SIU-TING. 2010. Reptilia, Squamata, Iguanidae, *Enyaliooides touzeti* Torres-Carvajal, Almendáriz, Valencia, Yáñez-Muñoz and Reyes, 2008: distribution extension and first country record for Peru. Check List 6(3): 405–407. doi: [10.15560/6.3.405](https://doi.org/10.15560/6.3.405)

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APPENDIX

Table A1. Summary of known localities and localities presented in this paper. Legends: EPN = Escuela Politécnica Nacional, FHGO = Fundación Herpetológica Gustavo Orcés, DHMECN = División de Herpetología Museo Ecuatoriano de Ciencias Naturales, MUSM = Museo de Historia Natural San Marcos, CORBIDI = Centro de Ornitológia y Biodiversidad, MZUTI = Museo de Zoología Universidad Tecnológica Indoamérica, MZUA = Museo de Zoología Universidad del Azuay. * = Field number.

Catalog number	Locality	Latitude	Longitude	Altitude (m)	Reference
EPN 10306 (holotype), 10307, 10700, 10720, 10735	Ponce Enríquez, Azuay	03°03'00" S	079°41'25" W	443	TORRES-CARVAJAL et al. 2008
FHGO 1205, 1451	Tamarindo, Azuay	02°47'00" S	079°33'00" W	400	TORRES-CARVAJAL et al. 2008
DHMECN 1396	Manta Real, Cañar	02°34'00" S	079°21'00" W	300	TORRES-CARVAJAL et al. 2008
DHMECN 2575, 3847	Buenaventura Reserve, El Oro	03°38'43" S	079°45'48" W	600	TORRES-CARVAJAL et al. 2008
MUSM 17560, CORBIDI 04517	Cerros de Amotape, Peru	03°50'34.2" S	080°12'38.8" W	740	VENEGAS et al. 2010
MZUTI 3374	Flor y Selva, Guayas	02°39'25" S	079°31'52" W	136	Present work
MZUTI 2646	Huatacón, Cañar	02°29'24" S	079°10'57" W	1045	Present work
MZUA 157	Ocaña, Cañar	02°29'22" S	079°10'50" W	1086	Present work
*LCCJ 001	Masvale-Churute, Guayas	02°25'05.9" S	079°38'58.8" W	50	Present work
*LCCJ 002	Cimalón-Churute, Guayas	02°26'33.6" S	079°33'44.5" W	234	Present work